CLAIMS

What is claimed is:

1. An alloy, comprising:

a Ni-based matrix comprising, on a weight basis, about 5-7% Al, up to about 0.025% B, about 0.1-0.5% C, about 3-13% Co, about 2-7% Cr, up to about 5% Mo, up to about 1% Nb, about 2-7% Re, about 10-13% Ta, up to about 1.8% Ti, about 4-7% W, up to about 1% V, up to about 0.2% Hf, and up to about 0.1% Zr, the balance being essentially Ni and incidental impurities.

2. The alloy of claim 1, wherein the Ni-based matrix comprises, on a weight basis, about 0.8-1.8% Ti.

3. The alloy of claim 1, wherein the Ni-based matrix comprises, on a weight basis, about 5-6% Al, up to about 0.01% B, about 0.15-0.3% C, about 11-13% Co, about 3-5% Cr, about 0.8-1.8% Mo, about 4.5-5.6% Re, about 10-12% Ta, about 5-6% W, up to about 1% V, up to about 0.2% Hf, and up to about 0.1% Zr, the balance being essentially Ni and incidental impurities.

4. The alloy of claim 1, wherein the Ni-based matrix comprises, on a weight basis, about 5-6.1% Al, up to about 0.01% B, about 0.15-0.3%C, about 6.25-7.25% Co, about 2-3.1% Cr, up to about 1.1% Mo, about 0.1-1% Nb, about 4.75-5.9% Re, about 9-11% Ta, about 0.5-1.5% Ti, about 5.5-6.8% W, up to about 1% V, up to about 0.2% Hf, and up to about 0.1% Zr, the balance being essentially Ni and incidental impurities.

5. The alloy of claim 1, further comprising an aligned eutectic reinforcing fibrous phase disposed within the Ni-based matrix, the aligned eutectic reinforcing fibrous phase comprising a carbide.

6. The alloy of claim 5, wherein the carbide comprises substantially TaC.

7. A directionally solidified eutectic superalloy, comprising:

a Ni-based matrix comprising, on a weight basis, about 5-7% Al, up to about 0.025% B, about 0.1-0.5% C, about 3-13% Co, about 2-7% Cr, up to about 5% Mo, up to about 1% Nb, about 2-7% Re, about 10-13% Ta, up to about 1.8% Ti, about 4-7% W, up to about 1% V, up to about 0.2% Hf, and up to about 0.1% Zr, the balance being essentially Ni and incidental impurities; and

an aligned eutectic reinforcing fibrous phase disposed within the Ni-based matrix, the aligned eutectic reinforcing fibrous phase comprising a carbide.

8. The directionally solidified eutectic superalloy of claim 7, wherein the Ni-based matrix comprises, on a weight basis, about 0.8-1.8% Ti.

9. The directionally solidified eutectic superalloy of claim 7, wherein the Ni-based matrix comprises, on a weight basis, about 5-6% Al, up to about 0.01% B, about 0.15-0.3% C, about 11-13% Co, about 3-5% Cr, about 0.8-1.8% Mo, about 4.5-5.6% Re, about 10-12% Ta, about 5-6% W, up to about 1% V, up to about 0.2% Hf, and up to about 0.1% Zr, the balance being essentially Ni and incidental impurities.

10. The directionally solidified eutectic superalloy of claim 7, wherein the Ni-based matrix comprises, on a weight basis, about 5-6.1% Al, up to about 0.01% B, about 0.15-0.3%C, about 6.25-7.25% Co, about 2-3.1% Cr, up to about 1.1% Mo, about 0.1-1% Nb, about 4.75-5.9% Re, about 9-11% Ta, about 0.5-1.5% Ti, about 5.5-6.8% W, up to about 1% V, up to about 0.2% Hf, and up to about 0.1% Zr, the balance being essentially Ni and incidental impurities.

11. The directionally solidified eutectic superalloy of claim 7, wherein the carbide comprises substantially TaC.

12. An article of manufacture comprising an alloy, the alloy comprising:

a Ni-based matrix comprising, on a weight basis, about 5-7% Al, up to about 0.025% B, about 0.1-0.5% C, about 3-13% Co, about 2-7% Cr, up to about 5% Mo, up to about 1% Nb, about 2-7% Re, about 10-13% Ta, up to about 1.8% Ti, about 4-7% W, up to about 1% V, up to about 0.2% Hf, and up to about 0.1% Zr, the balance being essentially Ni and incidental impurities.

13. The article of manufacture of claim 12, wherein the Ni-based matrix comprises, on a weight basis, about 0.8-1.8% Ti.

14. The article of manufacture of claim 12, wherein the Ni-based matrix comprises, on a weight basis, about 5-6% Al, up to about 0.01% B, about 0.15-0.3% C, about 11-13% Co, about 3-5% Cr, about 0.8-1.8% Mo, about 4.5-5.6% Re, about 10-12% Ta, about 5-6% W, up to about 1% V, up to about 0.2% Hf, and up to about 0.1% Zr, the balance being essentially Ni and incidental impurities.

15. The article of manufacture of claim 12, wherein the Ni-based matrix comprises, on a weight basis, about 5-6.1% Al, up to about 0.01% B, about 0.15-0.3%C, about 6.25-7.25% Co, about 2-3.1% Cr, up to about 1.1% Mo, about 0.1-1% Nb, about 4.75-5.9% Re, about 9-11% Ta, about 0.5-1.5% Ti, about 5.5-6.8% W, up to about 1% V, up to about 0.2% Hf, and up to about 0.1% Zr, the balance being essentially Ni and incidental impurities.

16. The article of manufacture of claim 12, wherein the alloy further comprises an aligned eutectic reinforcing fibrous phase disposed within the Ni-based matrix, the aligned eutectic reinforcing fibrous phase comprising a carbide.

17. The article of manufacture of claim 16, wherein the carbide comprises substantially TaC.

18. The article of manufacture of claim 12, wherein the article of manufacture comprises a gas turbine engine component.

19. The article of manufacture of claim 18, wherein the gas turbine engine component comprises a turbine airfoil.

20. An article of manufacture comprising a directionally solidified eutectic superalloy, the directionally solidified eutectic superalloy comprising:

a Ni-based matrix comprising, on a weight basis, about 5-7% Al, up to about 0.025% B, about 0.1-0.5% C, about 3-13% Co, about 2-7% Cr, up to about 5% Mo, up to about 1% Nb, about 2-7% Re, about 10-13% Ta, up to about 1.8% Ti, about 4-7% W, up to about 1% V, up to about 0.2% Hf, and up to about 0.1% Zr, the balance being essentially Ni and incidental impurities; and

an aligned eutectic reinforcing fibrous phase disposed within the Ni-based matrix, the aligned eutectic reinforcing fibrous phase comprising a carbide.

21. The article of manufacture of claim 20, wherein the Ni-based matrix comprises, on a weight basis, about 0.8-1.8% Ti.

22. The article of manufacture of claim 20, wherein the Ni-based matrix comprises, on a weight basis, about 5-6% Al, up to about 0.01% B, about 0.15-0.3% C, about 11-13% Co, about 3-5% Cr, about 0.8-1.8% Mo, about 4.5-5.6% Re, about 10-12% Ta, about 5-6% W, up to about 1% V, up to about 0.2% Hf, and up to about 0.1% Zr, the balance being essentially Ni and incidental impurities.

23. The article of manufacture of claim 20, wherein the Ni-based matrix comprises, on a weight basis, about 5-6.1% Al, up to about 0.01% B, about 0.15-0.3%C, about 6.25-7.25% Co, about 2-3.1% Cr, up to about 1.1% Mo, about 0.1-1% Nb, about 4.75-5.9% Re, about 9-11% Ta, about 0.5-1.5% Ti, about 5.5-6.8% W, up

to about 1% V, up to about 0.2% Hf, and up to about 0.1% Zr, the balance being essentially Ni and incidental impurities.

24. The article of manufacture of claim 20, wherein the carbide comprises substantially TaC.

25. The article of manufacture of claim 20, wherein the article of manufacture comprises a gas turbine engine component.

26. The article of manufacture of claim 25, wherein the gas turbine engine component comprises a turbine airfoil.